FMOS3439KDW1-Q1

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FMOS3439KDW1-Q1

N-Channel And P-Channel Enhancement Mode MOSFET ESD Protection

Features

- N-Channel : 20V / 0.75A.
  $R_{DS(ON)}$ ≤ 380mΩ, @V_{GS}=4.5V, I_D=0.65A.
  $R_{DS(ON)}$ ≤ 450mΩ, @V_{GS}=2.5V, I_D=0.55A.
  $R_{DS(ON)}$ ≤ 800mΩ, @V_{GS}=1.8V, I_D=0.45A.
- P-Channel : -20V/-0.66A.
  $R_{DS(ON)}$≤ 520mΩ, @-V_{GS}=4.5V, -I_D=1A.
  $R_{DS(ON)}$ ≤ 780mΩ, @-V_{GS}=2.5V, -I_D=0.8A.
- Low on-resistance.
- Operated at low logic level gate drive.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOS3439KDW1-Q1-H.

Application

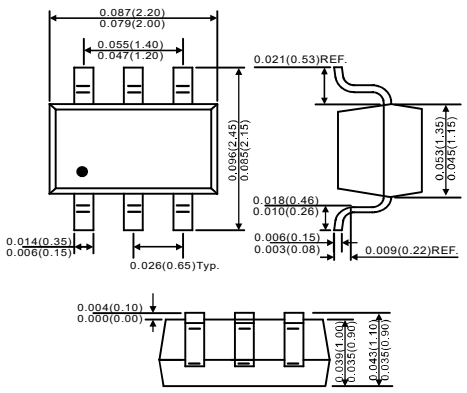
- Load/power switching.
- Interfacing switching.
- Battery management for ultra small portable electronics.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-363.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline

SOT-363



Dimensions in inches and (millimeters)

Maximum ratings (At T_A=25°C unless otherwise noted)

Parameter	Symbol	Ratings		Unit
		N-Channel	P-Channel	
Drain to source voltage	V_{DS}	20	-20	V
Gate-source voltage	V_{GS}	±8	±12	V
Continuous drain current (Note 1)	I_D	0.75	-0.66	A
Pulsed drain current, t_p=10μs	I_{DM}	1.8	-1.2	A
Thermal resistance, junction to ambient (Note 1)	$R_{\theta JA}$	833		°C/W
Lead temperature for soldering purposes (1/8" from case for 10 seconds)	T_L	+260		°C
Junction temperature	T_J	+150		°C
Storage temperature range	T_{STG}	-55 to + 150		°C

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Electrical characteristics (At T_C=25°C unless otherwise specified)

N-Channel

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static parameters						
Drain-source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	20			V
Drain-source leakage current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V			±20	μA
On characteristics						
Gate threshold voltage (Note2)	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.35	0.75	1.1	V
Static drain-source on-state resistance (Note2)	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=0.65A		190	380	mΩ
		V_{GS}=2.5V, I_D=0.55A		260	450	
		V_{GS}=1.8V, I_D=0.45A		390	800	
Forward tranconductance	g_{FS}	V_{DS}=10V, I_D=0.8A		1.6		S
Dynamic parameters (Note4)						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=16V, f=1.0MHz		79	120	pF
Out capacitance	C_{oss}			13	20	
Reverse transfer capacitance	C_{rss}			9	15	
Switching parameters (Note3,4)						
Turn-on delay time	$t_{d(on)}$	V_{DS}=10V, V_{GS}=4.5V, I_D=0.5A, R_G=10Ω		6.7		ns
Turn-on rise time	t_r			4.8		
Turn-off delay time	$t_{d(off)}$			17.3		
Turn-off fall time	t_f			7.4		
Source-drain diode ratings and characteristics						
Diode forward voltage (Note3)	V_{SD}	I_S=0.15A, V_{GS}=0V			1.2	V

Note :
1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse test : pulse width = 300us, duty cycle =2%.
3. Switching characteristics are independent of operating junction temperature.
4. Guaranteed by design, not subject to producting.

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Electrical characteristics (At T_C=25°C unless otherwise specified)

P-Channel

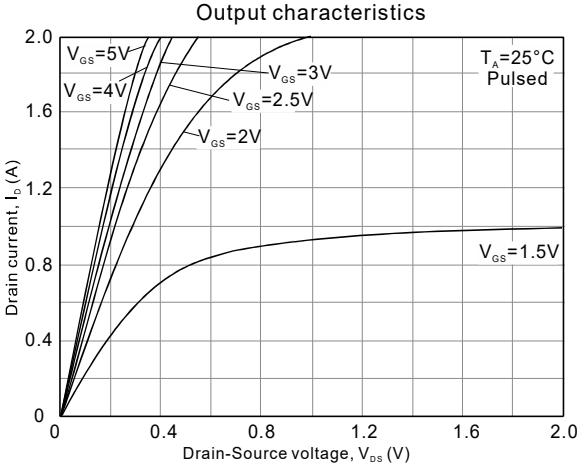
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static parameters						
Drain-source breakdown voltage	$-BV_{DSS}$	$-I_D$=250μA, V_{GS}=0V	20			V
Drain-source leakage current	$-I_{DSS}$	$-V_{DS}$=20V, V_{GS}=0V			1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V			±20	μA
On characteristics						
Gate threshold voltage (Note2)	$-V_{GS(TH)}$	V_{DS}=V_{GS}, $-I_D$=250μA	0.35	0.6	1.1	V
Static drain-source on-state resistance (Note2)	$R_{DS(ON)}$	$-V_{GS}$=4.5V, $-I_D$=1A		450	520	mΩ
		$-V_{GS}$=2.5V, $-I_D$=0.8A		650	780	
		$-V_{GS}$=1.8V, $-I_D$=0.5A		950		
Forward tranconductance (Note2)	g_{FS}	$-V_{DS}$=10V, $-I_D$=0.54A		1.2		S
Dynamic parameters (Note4)						
Input capacitance	C_{iss}	V_{GS}=0V, $-V_{DS}$=16V, f=1.0MHz		113		pF
Out capacitance	C_{oss}			15		
Reverse transfer capacitance	C_{rss}			9		
Switching parameters (Note3,4)						
Turn-on delay time	$t_{d(on)}$	$-V_{DS}$=10V, $-V_{GS}$=4.5V, $-I_D$=0.2A, R_G=10Ω		9		ns
Turn-on rise time	t_r			5.7		
Turn-off delay time	$t_{d(off)}$			32.6		
Turn-off fall time	t_f			20.3		
Source-drain diode ratings and characteristics						
Diode forward voltage	$-V_{SD}$	$-I_S$=0.5A, V_{GS}=0V			1.2	V

Note :
1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse test : pulse width = 300us, duty cycle =2%.
3. Switching characteristics are independent of operating junction temperature.
4. Guaranteed by design, not subject to producting.

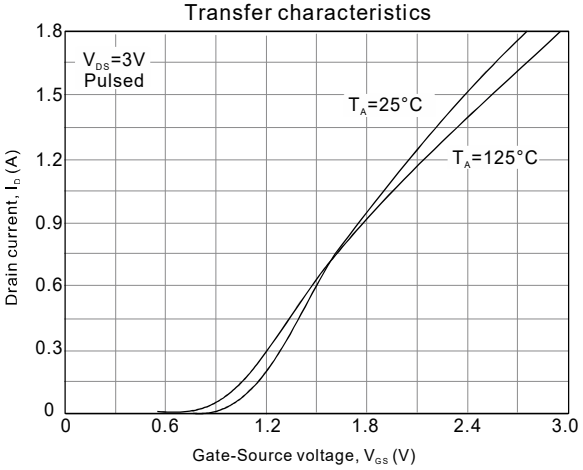
FMOS3439KDW1-Q1

Typical performance characteristics (N-Channel)

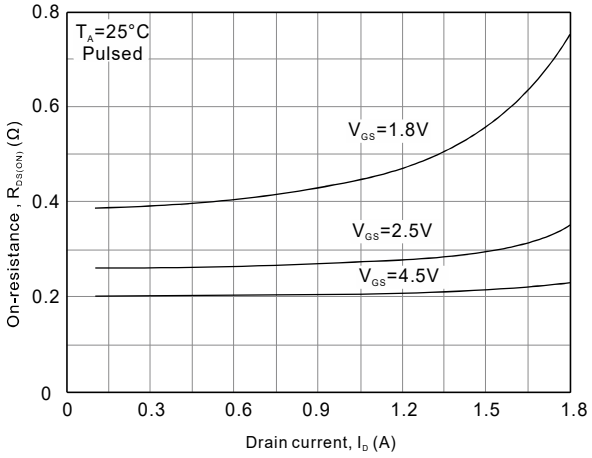
Output characteristics



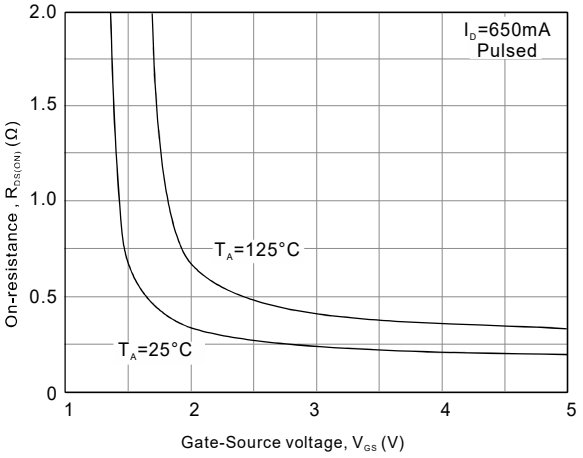
Transfer characteristics



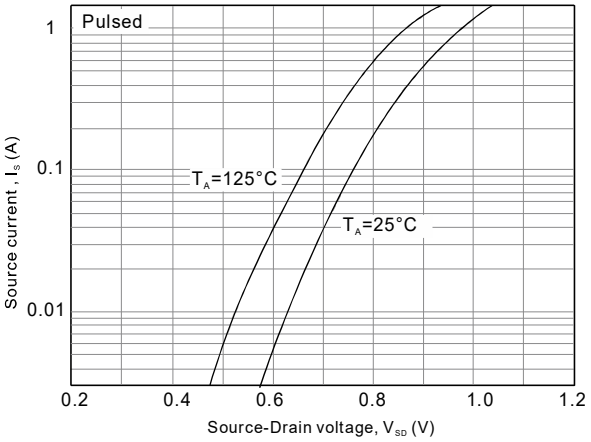
On-resistance vs. Drain current



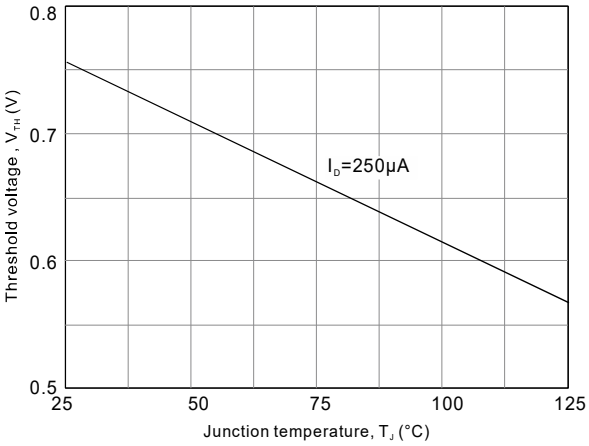
On-resistance vs. Gate-Source voltage



Source current vs. Source-Drain voltage



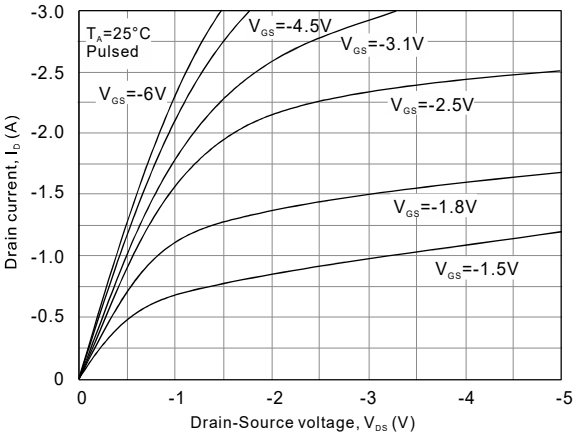
Threshold voltage



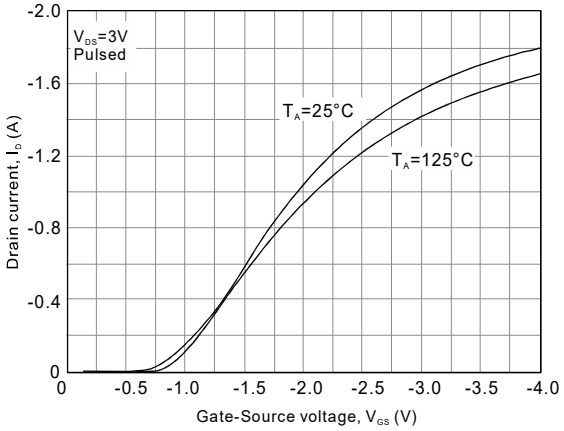
FMOS3439KDW1-Q1

Typical performance characteristics (P-Channel)

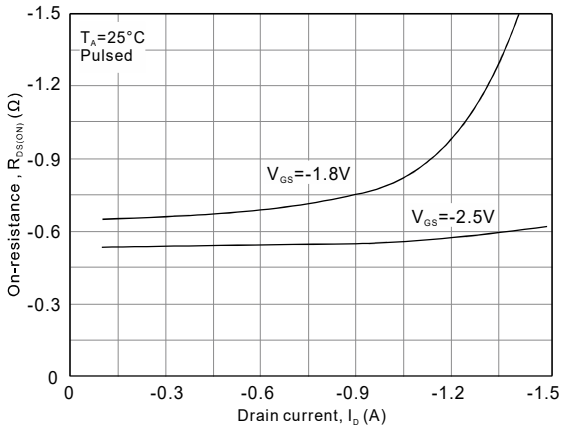
Output characteristics



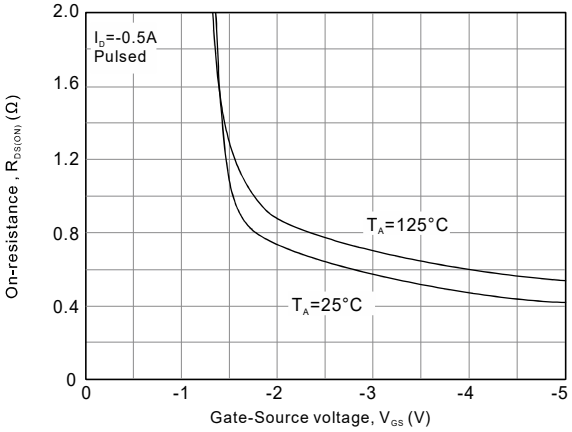
Transfer characteristics



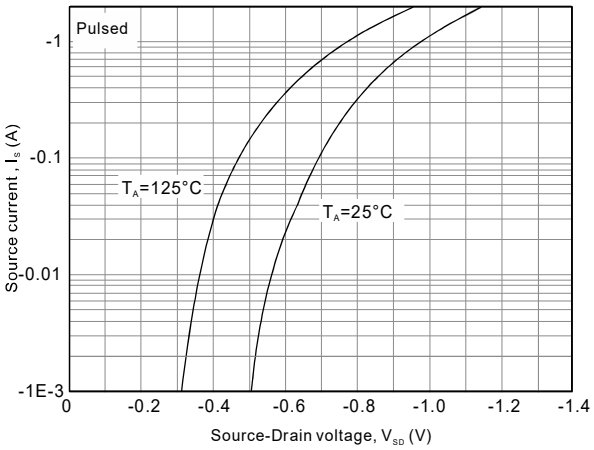
On-resistance vs. Drain current



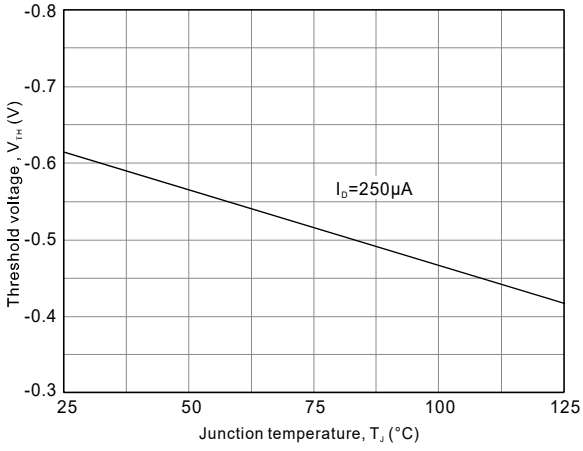
On-resistance vs. Gate-Source voltage



Source current vs. Source-Drain voltage

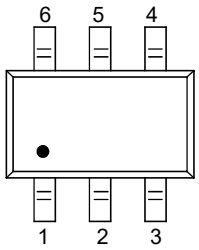
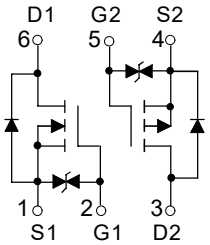


Threshold voltage



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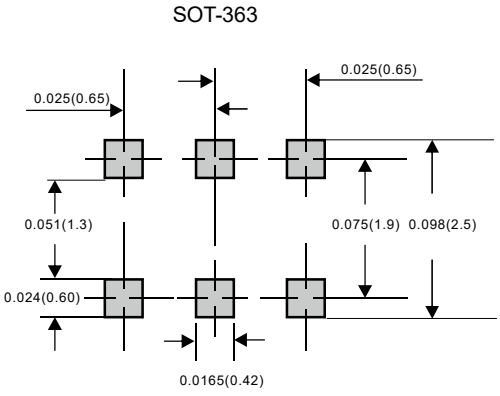
Pinning information

Pin	Simplified outline	Symbol
Pin1 Source1 Pin2 Gate1 Pin3 Drain2 Pin4 Source2 Pin5 Gate2 Pin6 Drain1		

Marking

Type number	Marking code
FMOS3439KDW1-Q1	49K

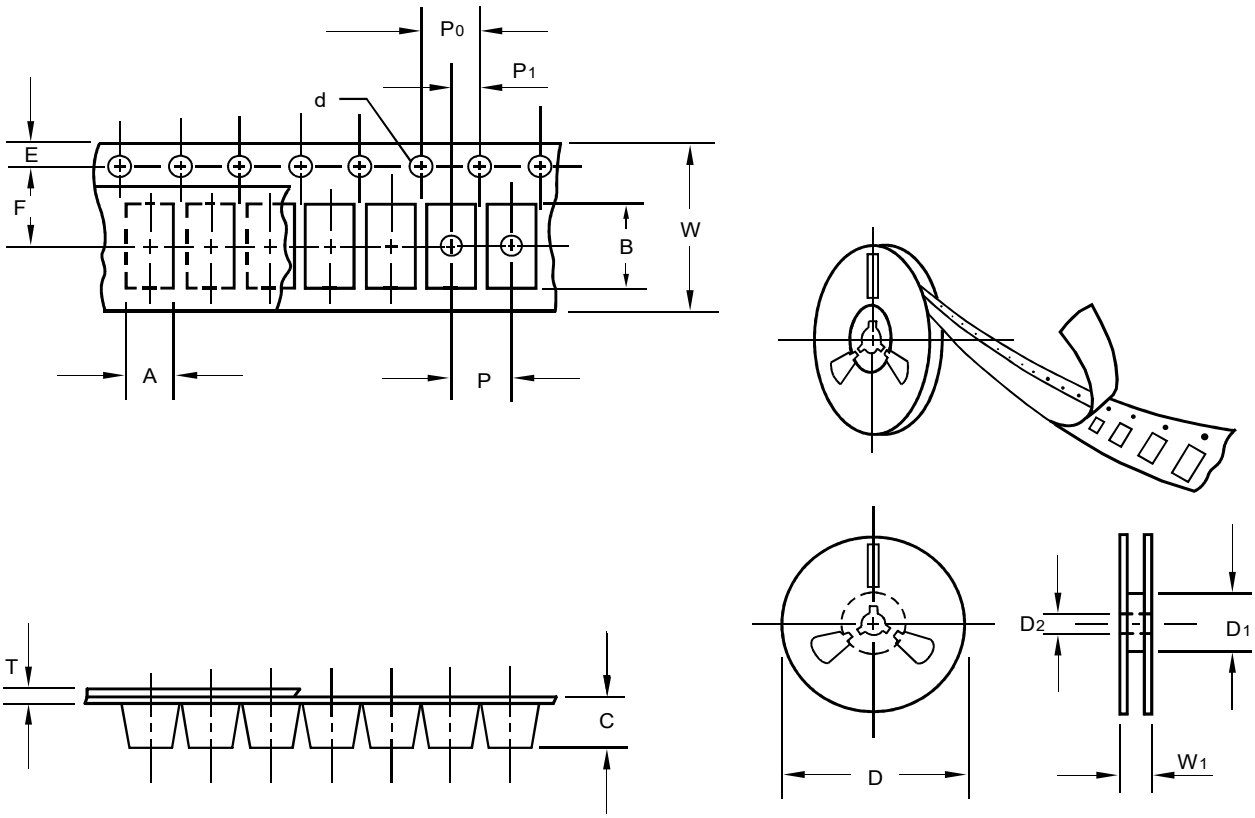
Suggested solder pad layout



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.2	2.25
Carrier length	B	0.2	2.55
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	62.00
Feed hole diameter	D_2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

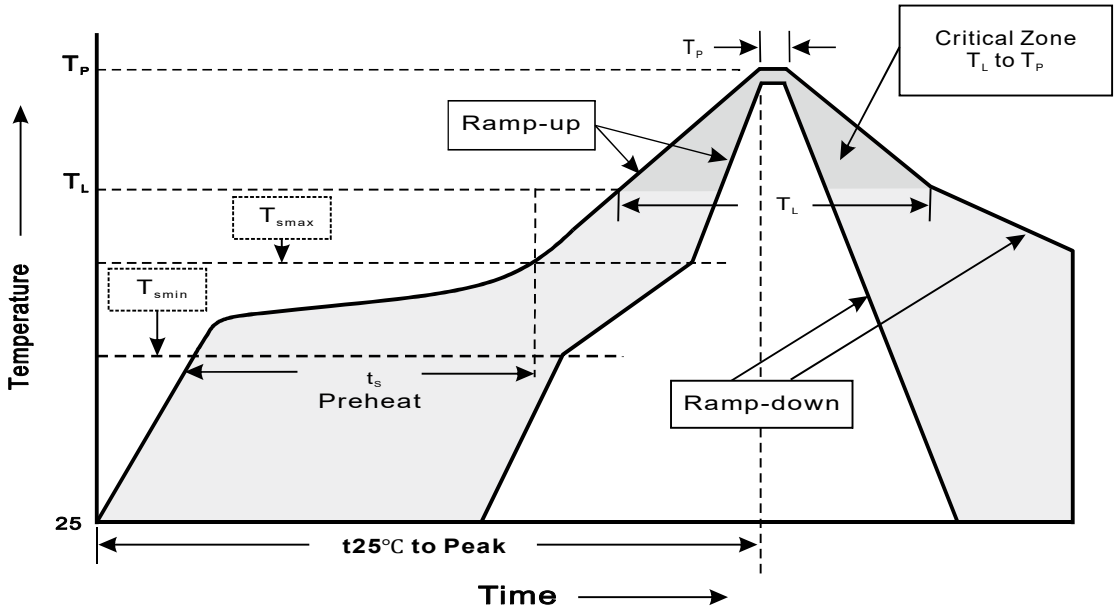
FMOS3439KDW1-Q1

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
SOT-363	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000

Suggested thermal profiles for soldering processes

1.Storage environment : Temperature=5℃~40℃ Humidity=55%±25%
2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile feature	Soldering Condition
Average ramp-up rate (T_L to T_P)	< 3℃/sec
Prehaeat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_S)	 150℃ 200℃ 60 ~120sec
T_{smax} to T_L -Ramp-up rate	< 3℃/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	 217℃ 60 ~ 260 sec
Peak Temperature(T_P)	255℃ -0/+5℃
Time within 5℃ of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	< 6℃/sec
Time 25℃ to peak temperature	< 6 minutes